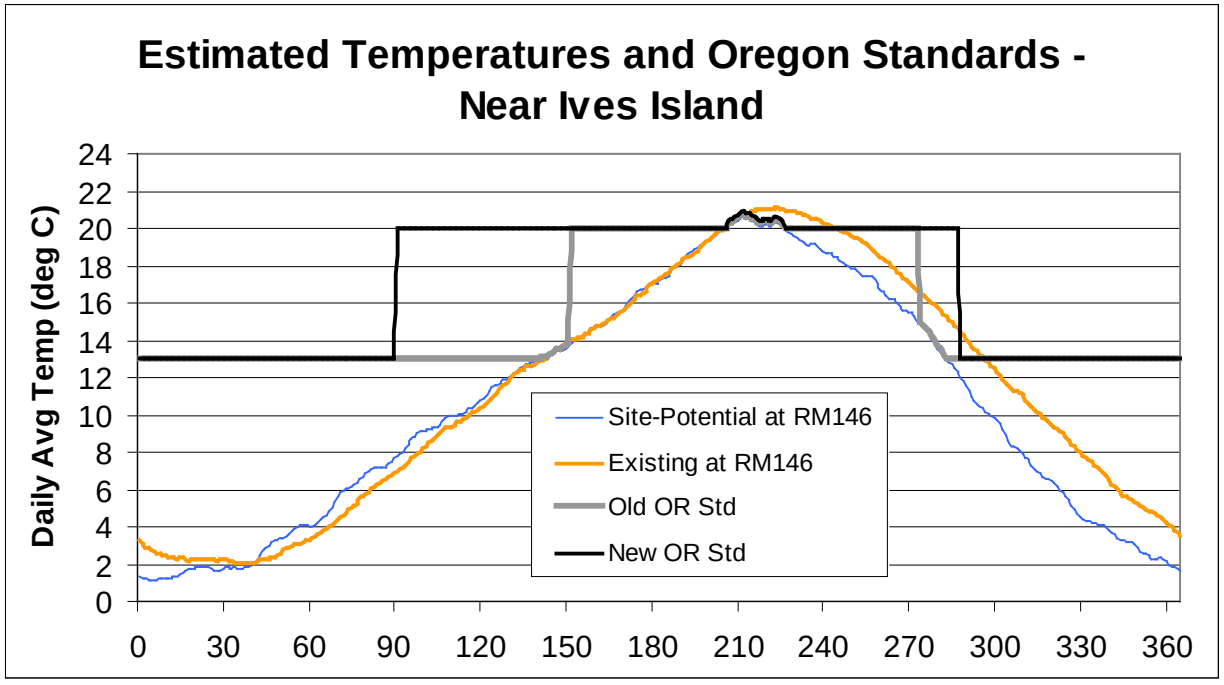
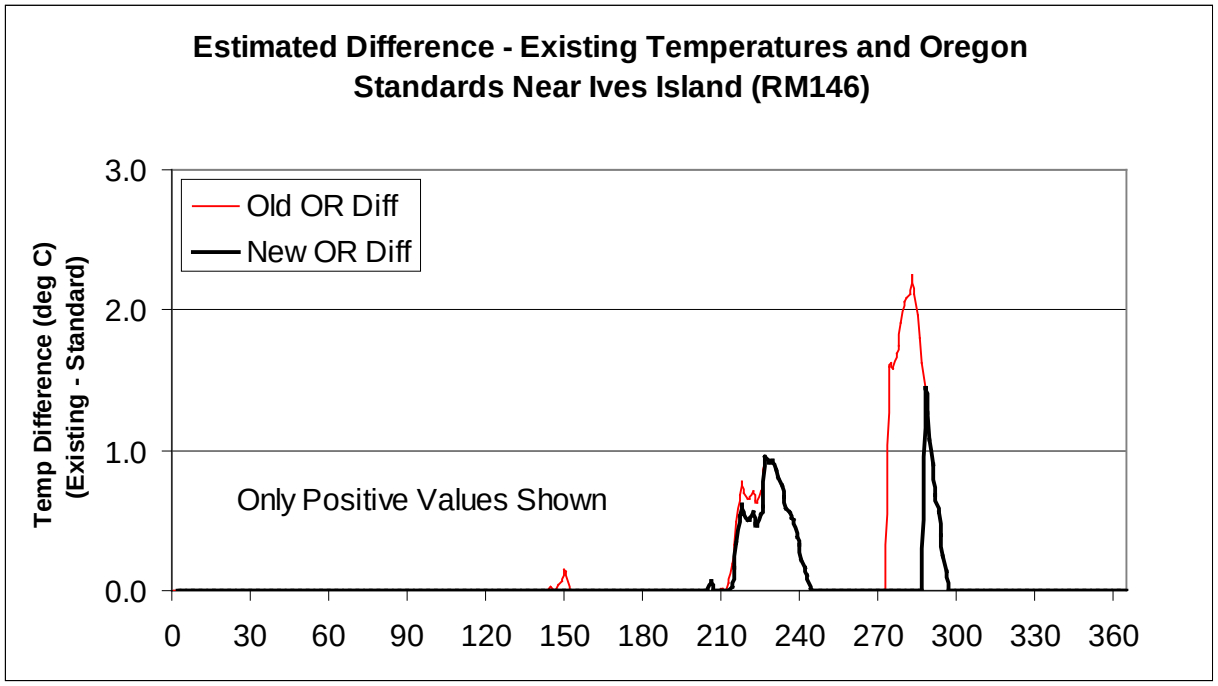
Estimated Dam Impacts to Columbia River Temperatures and Current Water Quality Standards

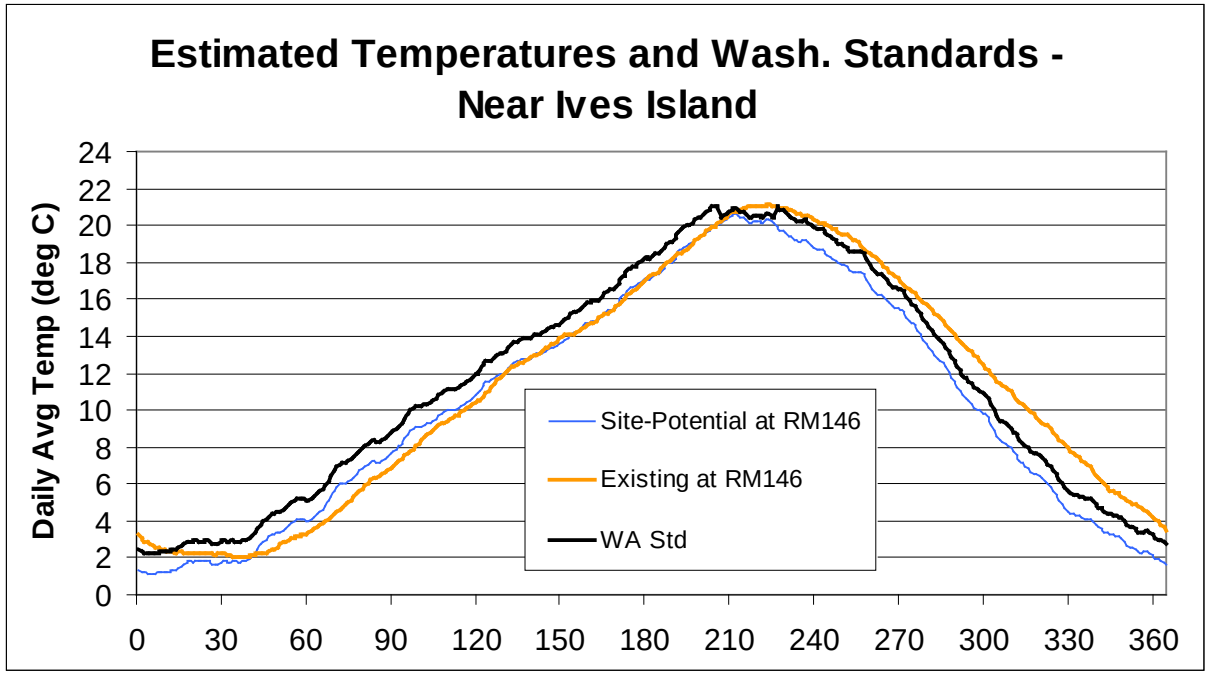
Model and Analysis

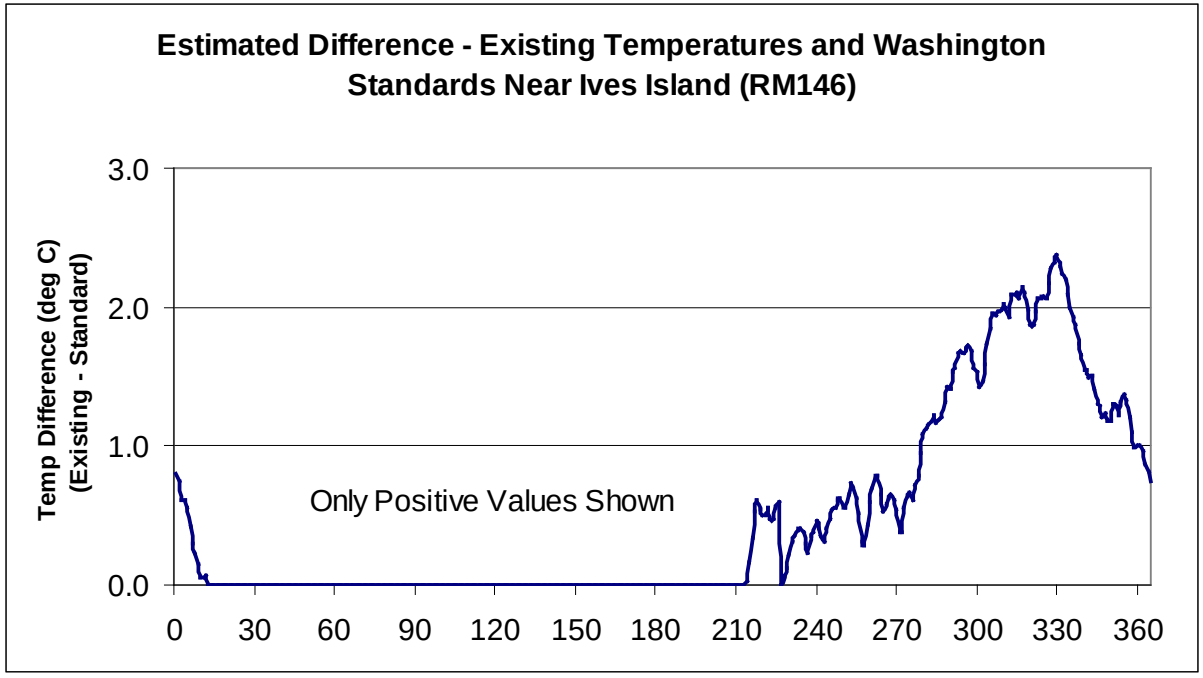
- RBM10 Model (Yearsley, et al, 2001)
  - Most recent “TMDL version” of RBM10
  - Includes point source inputs to river

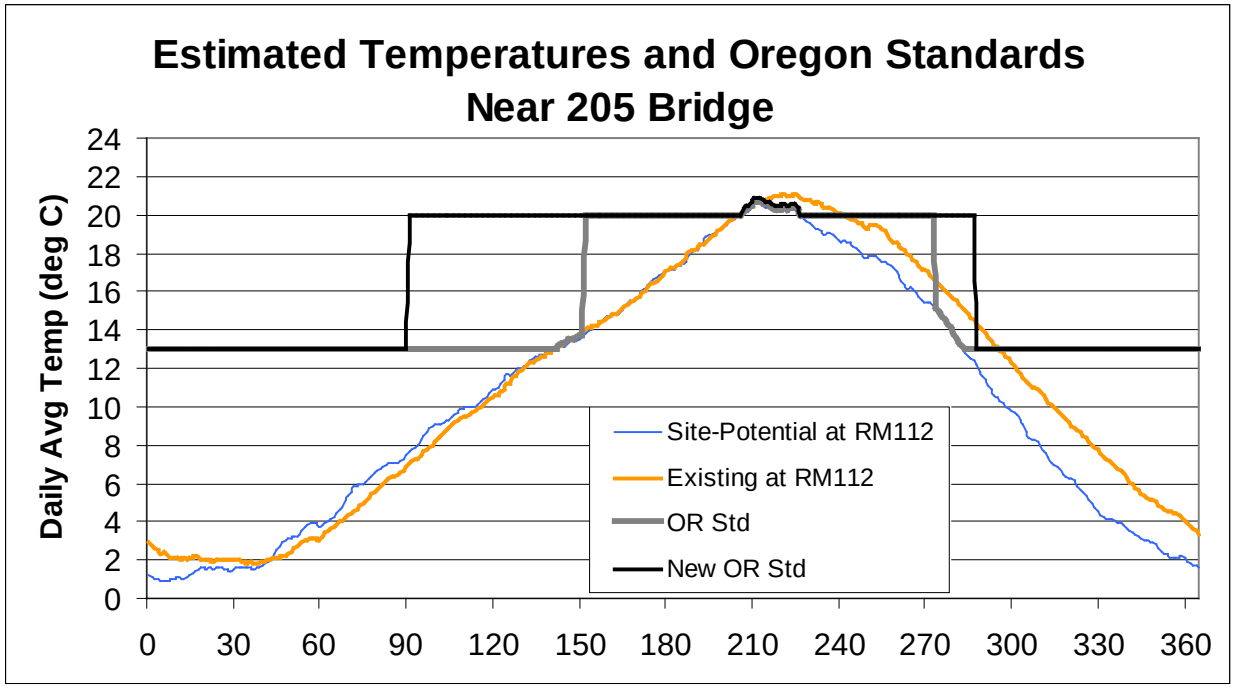
- Approach
  - 1. **Simulate Site Potential Temperatures**
    - 30 yr simulation (1970-1999)
    - Freely-flowing river plus point sources
  - 2. **Calculate Daily Water Quality Criterion**
    - Site Potential Temperatures plus incremental increases per the WQS for Oregon and Washington
  - 3. **Simulate Existing Temperatures**
    - Same as Site Potential except river is impounded by dams

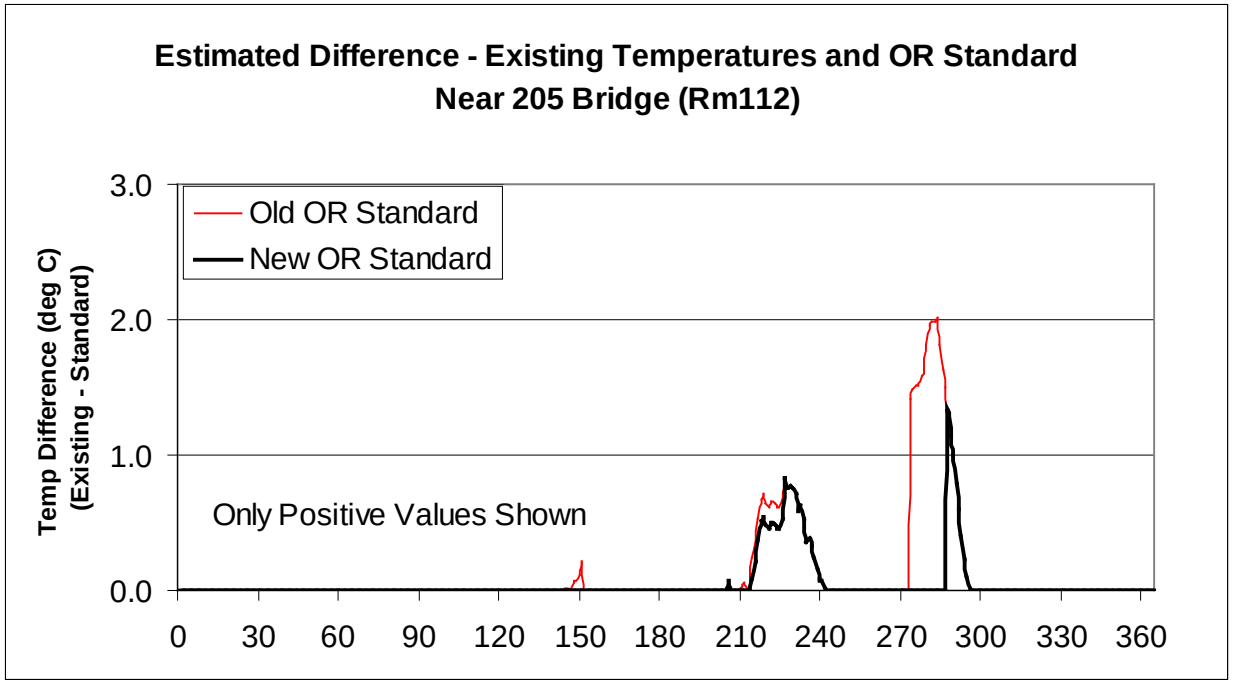

Estimated Temperatures and Oregon Standards - Near Ives Island
Daily Avg Temp (deg C)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
30
60
90
120
150
180
210
240
270
300
330
360
Site-Potential at RM146
Existing at RM146
Old OR Std
New OR Std

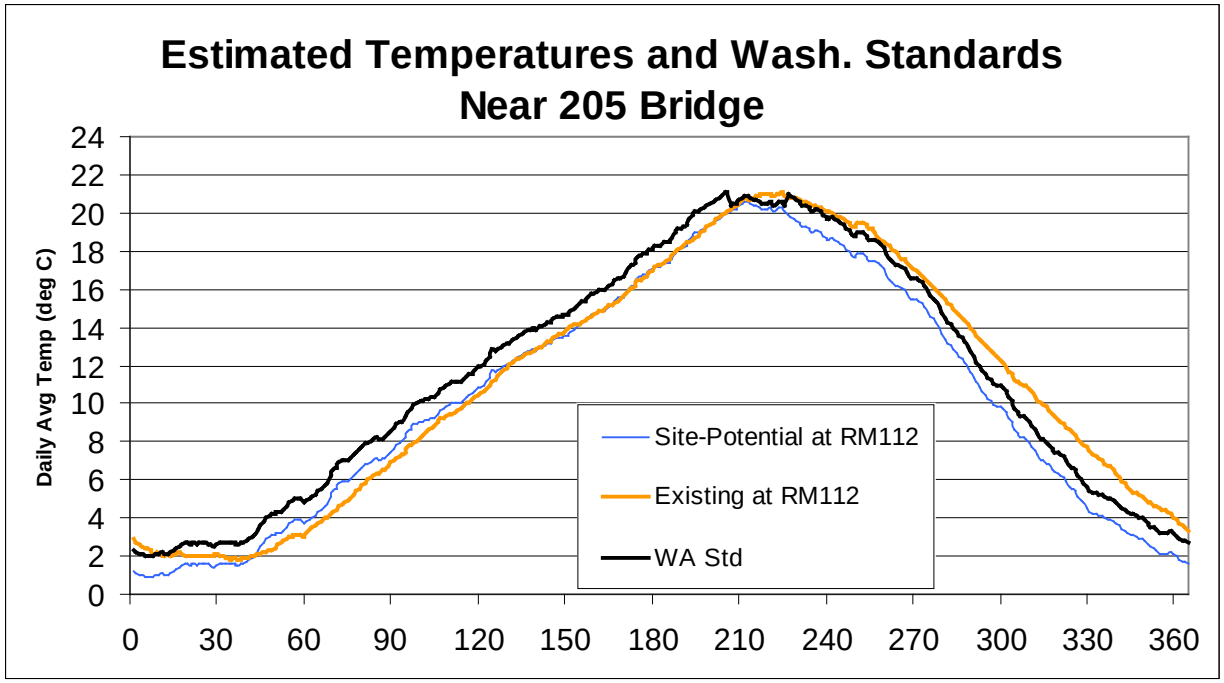

Estimated Difference - Existing Temperatures and Oregon Standards Near Ives Island (RM146)
Temp Difference (deg C) (Existing - Standard)
3.0
2.0
1.0
0.0
0
30
60
90
120
150
180
210
240
270
300
330
360
Old OR Diff
New OR Diff
Only Positive Values Shown

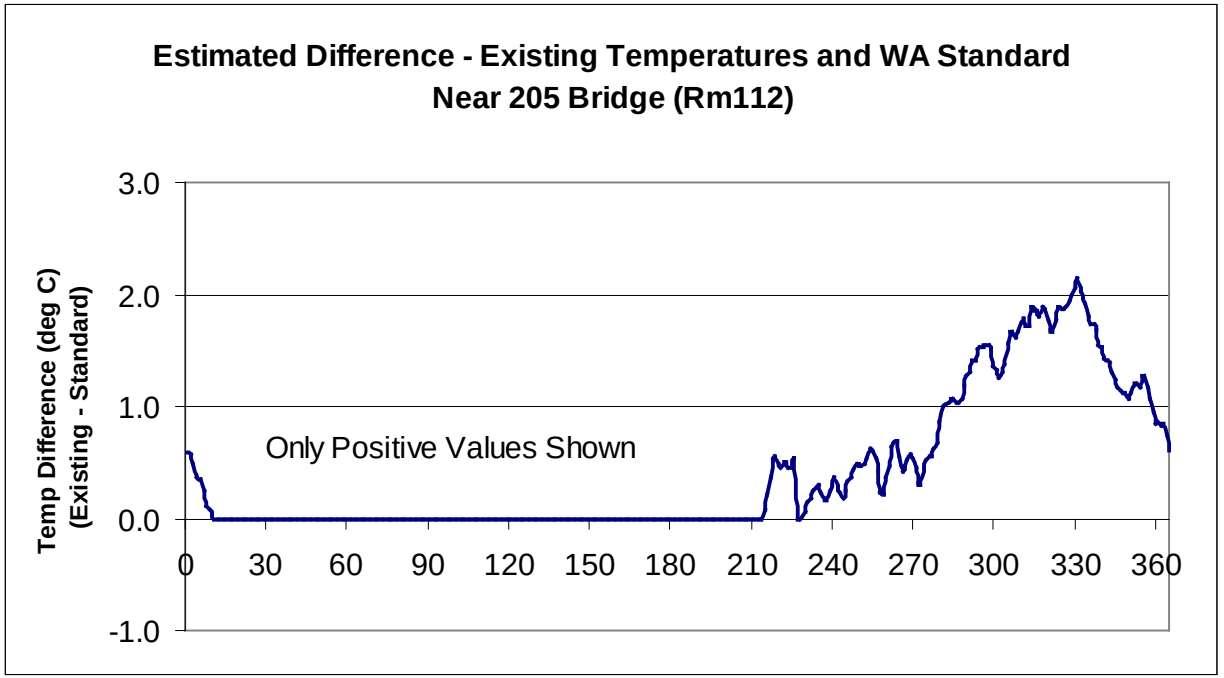

Estimated Temperatures and Wash. Standards - Near Ives Island
Daily Avg Temp (deg C)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
30
60
90
120
150
180
210
240
270
300
330
360
Site-Potential at RM146
Existing at RM146
WA Std

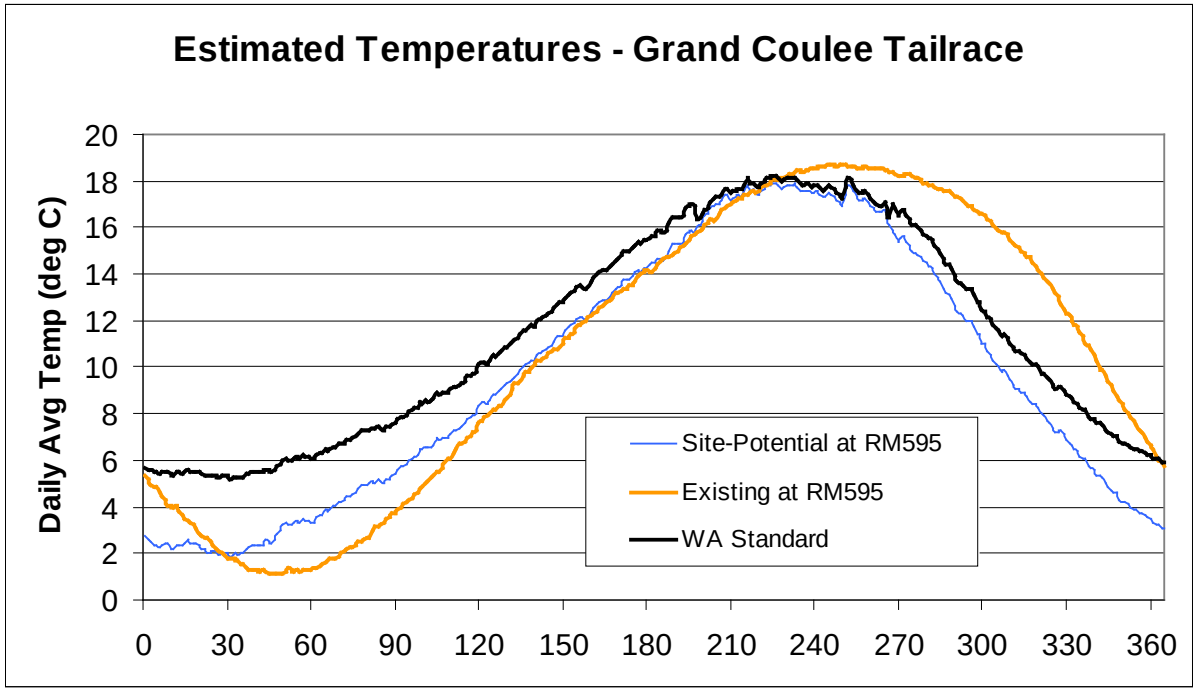

Estimated Difference - Existing Temperatures and Washington Standards Near Ives Island (RM146)
Temp Difference (deg C) (Existing - Standard)
3.0
2.0
1.0
0.0
Only Positive Values Shown
0
30
60
90
120
150
180
210
240
270
300
330
360

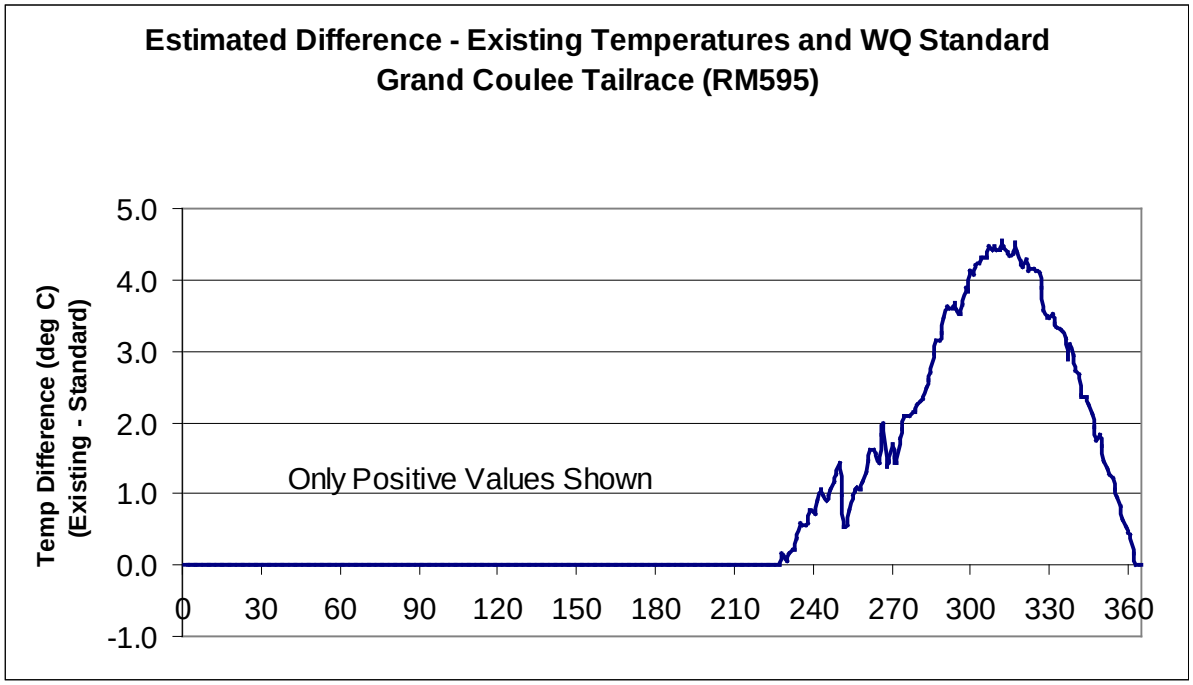

Estimated Temperatures and Oregon Standards
Near 205 Bridge
Daily Avg Temp (deg C)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
30
60
90
120
150
180
210
240
270
300
330
360
Site-Potential at RM112
Existing at RM112
OR Std
New OR Std


Estimated Difference - Existing Temperatures and OR Standard
Near 205 Bridge (Rm112)
Temp Difference (deg C)
(Existing - Standard)
3.0
2.0
1.0
0.0
Old OR Standard
New OR Standard
Only Positive Values Shown
0
30
60
90
120
150
180
210
240
270
300
330
360


Estimated Temperatures and Wash. Standards
Near 205 Bridge
Daily Avg Temp (deg C)
24
22
20
18
16
14
12
10
8
6
4
2
0
0
30
60
90
120
150
180
210
240
270
300
330
360
Site-Potential at RM112
Existing at RM112
WA Std


Estimated Difference - Existing Temperatures and WA Standard
Near 205 Bridge (Rm112)
Temp Difference (deg C)
(Existing - Standard)
3.0
2.0
1.0
0.0
-1.0
Only Positive Values Shown
0
30
60
90
120
150
180
210
240
270
300
330
360


Estimated Temperatures - Grand Coulee Tailrace
Daily Avg Temp (deg C)
20
18
16
14
12
10
8
6
4
2
0
0
30
60
90
120
150
180
210
240
270
300
330
360
Site-Potential at RM595
Existing at RM595
WA Standard


Estimated Difference - Existing Temperatures and WQ Standard
Grand Coulee Tailrace (RM595)
Temp Difference (deg C)
(Existing - Standard)
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
0
30
60
90
120
150
180
210
240
270
300
330
360
Only Positive Values Shown

Conclusions

- New Oregon standards reduce but do not eliminate exceedances in August and October in Ives Island area
- Cumulative impacts exceed Washington standards in Ives Island area
- Grand Coulee causes local exceedances